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(54) Improvements in fastener devices primarily for recreational or gymnastic frames

(57) A fastener nut primarily for securing tubular members by means of U-bolts, especially for childrens' climbing frames, is tamper-proof and avoids sharp edges. The nut has a shank portion 1 which is tubular together with a head portion 2 integral therewith and having a juncture region comprising an outwardly tapering conical part 3. The face of the head has a flat surface 4 in which a socket 5 is provided, being e.g. of hexagonal or pentagonal form (as shown in Fig. 2) which requires a non-standard wrench to deter tampering. The face of the head joins the tapered portion 3 by means of an outlying angled area 8 contiguous with a radiused outer periphery 6.

The shank portion 1 has an internally threaded bore 7 which in use engages the threaded end of a U-bolt. The annular outlying peripheral region of the head 8 has a radiused or conically tapered part to provide a raised surface.

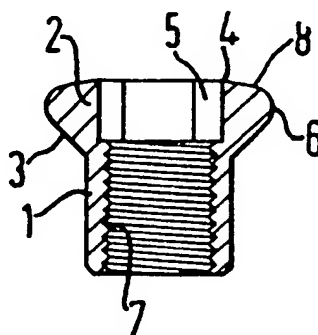


FIG. 1c.

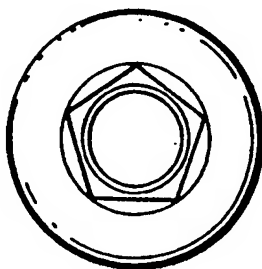


FIG. 2b.

GB 2 109 079 A

1 / 2

FIG. 1a.

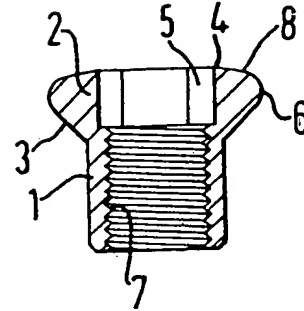
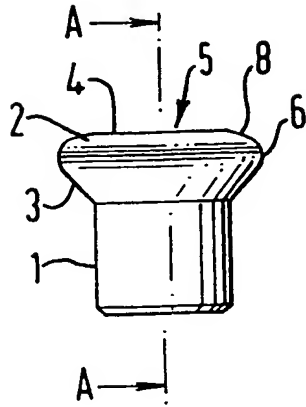


FIG. 1c.

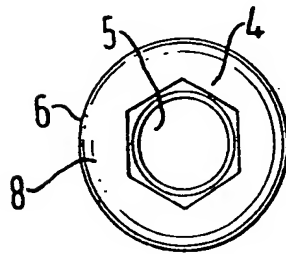


FIG. 1b.

FIG. 2a.

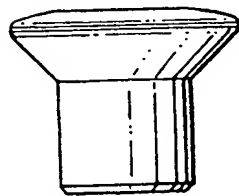


FIG. 2c.

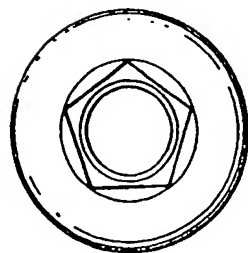
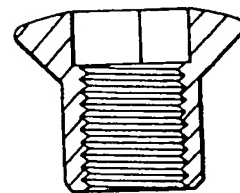


FIG. 2b.

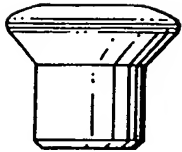


FIG. 3a.

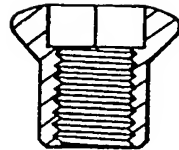


FIG. 3c.

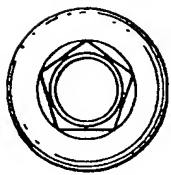


FIG. 3b

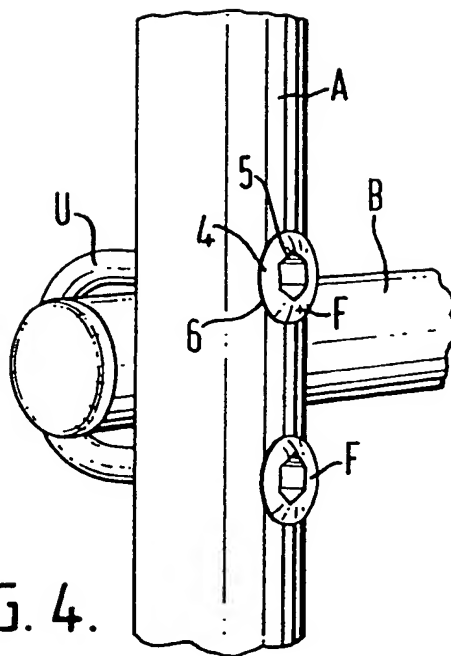


FIG. 4.

SPECIFICATION

Improvements in fastener devices primarily for recreational or gymnastic frames

This invention relates to a fastener device which is primarily intended for a recreational or gymnastic climbing frame especially frames for childrens' play areas. Such framework is normally constructed from tubular members arranged in crossing configuration and with the members secured usually mutually at right angles in the manner of a scaffold.

Hitherto, such members have been secured using U-bolts and like clamping devices, but such arrangements offer a hazard due to projecting sharp edges of the bolt ends and securing nuts. Furthermore, such an arrangement is easily vandalised or unlawfully dismantled.

It is an object of this invention to provide primarily a fastening nut for use with a U-bolt or other bolt, and secondarily a climbing frame structure which embodies a U-bolt and fastening nut not having any substantially sharp edges liable to cause injury.

According to this invention there is provided a fastener nut for engagement with a bolt end, the nut comprising a tubular internally threaded shank portion with a head portion joined thereto through an outwardly conically tapering surface, the peripheral edge of the head having a smoothly radiused surface and the head further including a socket profiled for engagement with a tightening tool.

The head may include a hexagonal socket or preferably a pentagonal one which is adapted to be engaged by a special non-standard key wrench. Other geometric shape sockets may be provided.

When used for securing together two tubular members by means of a U-bolt, one of the members is apertured to receive the limbs of the U-bolt and the shank of the fastening member passes through an aperture to engage the threaded limb of the U-bolt. The conical surface thereby partially engages and abuts the aperture. Preferably the head of the fastening member is convexly radiused so that when assembled to a tubular member a substantially smooth outer surface is presented to avoid sharp edges and the like which might cause injury. In addition, the socket in the nut prevents unauthorised tampering.

In use the length of the limbs of the U-bolt will be arranged so that they do not project into the socket on the fastener when same is tightened in use.

Embodiments of the invention are shown by way of example only in the accompanying drawings, wherein:—

Figure 1 shows one embodiment of fastener device,

Figure 2 shows a second embodiment,

Figure 3 shows a third embodiment, and Figure 4 shows two tubular members secured by a U-bolt.

Referring to Figs. 1 to 3 of the drawings, the views *a*, *b* and *c* show respectively a side elevation, a plan view and a section on the line A-A of a fastener device. The device has a shank portion 1 which is tubular, together with a head portion 2 integral therewith and having a juncture region comprising an outwardly tapering conical part 3. The face of the head has a flat surface 4 in which a socket 5 is provided, being of hexagonal form in Fig. 1 and pentagonal form in Figs. 2 and 3. Other geometric shapes of socket could be provided. The face of the head joins the tapered portion 3 by means of an outlying angled area 8 contiguous with a radiused outer periphery 6, and in all embodiments the radius is 1.5 mm. Another preferred radius is 3.0 mm, and the angle of conicity of the surface 3 is 90°. These figures are, however, purely exemplary of a number of values falling within useful ranges. Generally the angle of conicity will be between 60° and 120°, and the radius between 1 and 5 mm.

The shank portion 1 has an internally threaded bore 7 which in use engages the threaded end of a U-bolt. It will be seen from the drawings that an annular outlying peripheral region of the head 8 has a radiused or conically tapered part to provide a raised surface. Fig. 4 of the drawings shows two tubular members A and B which are secured mutually at right angles by means of a U-bolt U having threaded limbs which are positioned within the member A. The U-bolt limbs are of a length such that they do not project from the member A and each limb is engaged by a fastener F of a kind previously described. As can be seen from Fig. 4, the configuration of the fastener provides a smooth convexly radiused outer surface which blends with the tube A to avoid any sharp edges liable to cause injury.

The head portion of the nut 4 may have a part spherical surface and would normally be radiused according to the diameter of the tubular member being secured. The arrangement of the fastener with the tubular portion provides a greater latitude for mating with the threaded limb of the U-bolt within the head portion and furthermore eliminates protrusion of the threaded part beyond the surface of the fastener.

CLAIMS

1. A fastener nut for engagement with a bolt end, the nut comprising a tubular internally threaded shank portion with a head portion joined thereto through an outwardly conically tapering surface, the peripheral edge of the head having a smoothly radiused surface and the head further including a socket profiled for engagement with a tightening

2

tool.

2. A nut in accordance with Claim 1, wherein the socket is hexagonal or pentagonal.
- 5 3. A nut in accordance with Claim 1 or 2, wherein the angle of the conical tapering surface is between 60 and 120°.
4. A nut in accordance with any preceding Claim, wherein the peripheral edge of the head has a radius between 1 and 5 mm.
- 10 5. A nut in accordance with any preceding Claim, wherein the head thereof has a convexly domed surface.
6. A nut in accordance with Claim 5, wherein the domed surface has a planar area surrounding the socket and an outlying angled area contiguous with the radiused tapering surface.
7. In combination a U-bolt having threaded limbs each engageable by a nut according to any preceding Claim, the combination being such that, in use, the U-bolt limbs engage the threaded shanks of respective nuts without intruding into the head portion thereof.
- 25 8. An assembly comprising a plurality of tubular members secured by the combination of Claim 7, wherein one such member is embraced by the U-bolt, another member having spaced apertures to receive the limbs of the U-bolt, the apertures being of a diameter to receive the nut shanks and a portion of the conically tapering surface.
- 30 9. A nut, a U-bolt fastener or a tubular framework substantially as herein described with reference to the drawings.
- 35